UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/740,826	12/21/2000	Ari Heikkinen	397.39397X00	6582

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EXAMINER
HARPER, V PAUL

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

	Application No.	Applicant(s)
Office Action Summary	09/740,826	HEIKKINEN ET AL.
	Examiner	Art Unit
	V. Paul Harper	2654

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☒ Claim(s) *6* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)   4)☐ Interview Summary (PTO-413) Paper No(s). _____ .
2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)   5)☐ Notice of Informal Patent Application (PTO-152)
3)☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *2,5* .   6)☐ Other: .

DETAILED ACTION

Information Disclosure Statement

1.   The Examiner has considered the references listed in the Information Disclosure

Statements dated 12/21/00 and 10/15/02. Copies of the Information Disclosure

Statements are attached to this office action.

Claim Objections

2.   Claim 6 is objected to because of the following informalities:

The limitation should read--the pitch period is determined based on said

autocorrelation--, since the autocorrelation technique is used to determine pitch period.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claim 1-3 and 8-10 are rejected under 35 U.S.C. 102(b) as being anticipated by

Swaminathan et al. (U.S. Patent 5,734,789), hereinafter referred to as Swaminathan.

Regarding claims 1 and 8, Swaminathan discloses a method for determining

voiced and unvoiced modes in a vocoder. Swaminathan's method includes the

following steps: **"dividing a speech signal segment into sub-segments"** (Figs. 15

and 17, col. 9, lines 9-30); **"determining a value relating to the voicing of respective**

speech signal sub-segments" (col. 8, lines 20-25); **"comparing said values with a**

predetermined threshold" (Fig. 15, items 15018 et seq., Fig, 17, items 17030 et seq.);

"making a decision on the voicing of the speech segment based on the number of

the values on one side of the threshold" (Fig 15, item 15035, Fig. 17, item 17050).

Regarding claims 2 and 9, Swaminathan teaches everything claimed, as applied

above (see claims 1 and 8, respectively). In addition, Swaminathan teaches, **"making**

a decision is based on whether the value relating to the voicing of the last sub-

segment is on the one side of the threshold" (Fig. 15, item 15032, and Fig. 17, item

17022, where the last sub-frame value is used in the decision).

Regarding claims 3 and 10, Swaminathan teaches everything claimed, as

applied above (see claims 1 and 8, respectively). In addition, Swaminathan teaches,

"making a decision is based on whether the values relating to the voicing of last

K_{tr} sub-segments are on the one side of the threshold" (Fig. 15, item 15032 and

preceding, and Fig. 17, item 17022 and preceding, where the last sub-frames values

are used in the decision).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

4.   Claims 4-7 and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Swaminathan in view of Hess ("Pitch and voicing determination," in Advances in

Speech Signal Processing, S. Furui et al. (eds), 1992).

Regarding claims 4, 11, 13 and 14 Swaminathan teaches everything claimed, as

applied above (see claims 1, 8, 9, and 10 respectively). In addition, Swaminathan

teaches testing the counter's final value against a fixed threshold (col. 9, lines, 24-25),

but Swaminathan does not specifically teach **"making a decision is based on**

whether the values relating to the voicing of substantially half of the sub-

segments of the speech signal segment are on the one side of the threshold."

However, the examiner contends that this concept was well known in the art, as taught

by Hess.

In the same field of endeavor, Hess teaches techniques for voicing determination

where adjacent frames are checked and the decision is made using a medial smoother

(i.e., the middle value setting the threshold to substantially half of the sub-segments) (p.

33, §2.1, ¶1, in particular the last two sentences).

Therefore, it would have been obvious to one having ordinary skill in the art at

the time the invention was made to modify Swaminathan by specifically providing the

decision technique, as taught by Hess, since this is an effective way to make a voicing

determination when the signal is noisy (p. 33, §2.1, ¶1).

Regarding claims 5 and 12, Swaminathan in view of Hess teach everything

claimed, as applied above (see claims 1 and 8, respectively). But Swaminathan does

not specifically teach **"value related to voicing of respective speech signal sub-segments comprises an autocorrelation value."** However, the examiner contends that this concept was well known in the art, as taught by Hess.

In the same field of endeavor, Hess teaches pitch and voice determination where an autocorrelation can be performed to determine pitch (p. 10, §1.3) and the pitch can be used to determine voicing (p. 33, §2.1, ¶1).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Swaminathan by specifically providing the autocorrelation technique, as taught by Hess, since it was well-know that this technique could be applied to accurately determine voicing.

Regarding claim 6, Swaminathan in view of Hess teach everything claimed, as applied above (see claim 5). But Swaminathan does not specifically teach **"the estimated pitch period is determined based on said autocorrelation value"** (corrected in view of the objection). However, the examiner contends that this concept was well known in the art, as taught by Hess.

Hess further teaches the use of autocorrelation to determine pitch period (lag) (p. 12, §1.3.2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Swaminathan in view of Hess by specifically using the autocorrelation technique to calculate pitch period, as taught by Hess, since the use of autocorrelation was well-know and a standard technique for determining pitch period.

Regarding claim 7, Swaminathan teaches everything claimed, as applied above (see claim 7). In addition, Swaminathan teaches the classification of each signal into one of three modes (abstract, col. 6, lines 35-45), but Swaminathan does not specifically teach **"the determining the voicing of a speech signal segment comprises a voiced/unvoiced decision."** However, the examiner contends that this concept was well known in the art, as taught by Hess.

In the same field of endeavor, Hess teaches techniques for making voicing decisions (i.e. voiced/unvoiced) (p. 32, §2).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Swaminathan by specifically providing a voice/unvoiced decision, as taught by Hess, since it was well-know that such a determination is useful in voice source analysis (Hess, p. 3, ¶1).

Citation of Pertinent Art

5.   The following prior art made of record but not relied upon is considered pertinent to the applicant's disclosure:

- Ihara (U.S. Patent 6,219,636) discloses a technique for determining voicing based on subframes of a frame.

- Rabiner ("Applications of a Nonlinear Smoothing Algorithm to Speech Processing," IEEE Transactions on Acoustics, Speech, and Signal Processing, December 1975) describes a nonlinear smoothing algorithm based on running medians.

- Siegel et al. ("Voiced/Unvoiced/Mixed Excitation Classification of Speech," IEEE

   Transactions on Acoustics, Speech, and Signal Processing, June 1982)

   describes various techniques including the use of autocorrelation and decision

   trees when the signals are predominantly of a particular type.

Conclusion

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9314

Hand-delivered responses should be brought to:

Crystal Park II
2121 Crystal Drive
Arlington, VA.
Sixth Floor (Receptionist)

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Dr. V. Paul Harper whose telephone number is (703)

305-4197. The examiner can normally be reached on Monday through Friday from 8:00

a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Richemond Dorvil, can be reached on (703) 305-9645. The fax phone

number for the Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the Technology Center 2600 Customer Service office

whose telephone number is (703) 306-0377.

VPH/vph
August 27, 2003

VIJAY CHAWAN
PRIMARY EXAMINER